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[Continued on next page]

(54) Title: INSECTICIDAL PROTEINS SECRETED FROM BACILLUS THURINGIENSIS AND USES THEREFOR

10	20	30	40
1 M K N R F S K V A L C T V P I L M V S T P A S S S M S A F A A E A K S P D L N V	1 M K Y K F S K V V K C T L S A L M L S T P A S S S M S A F A A E A K S P D L N V	1 M K Y K F S K V A I C T L S A L M L S T P A S S S M S A F A A E A K S P D L N V	1 M K Y K F S K V A M C T L S A L M L S T P A S S S M S A F A A E A K S P D L N V
1 M K Y K F S K V A X C T L S A L M L S T I A T P S M S V F A A E T T S P K L N X	1 M K Y K F S K V A X C T L S A L M L S T I A T P S M S V F A A E T T S P K L N X	1 M K Y K F S K V A X C T L S A L M L S T I A T P S M S V F A A E T T S P K L N X	1 M K Y K F S K V A X C T L S A L M L S T I A T P S M S V F A A E T T S P K L N X
+-----+-----+-----+-----+			
41 S Q Q V I G P Y A E S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 S Q Q V I G P Y A E S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 S Q Q V I G P Y A E S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 S Q Q V I G P Y A E S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H
41 S Q Q A I T P R A B S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 S Q Q A I T P R A B S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 S Q Q A I T P R A B S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 S Q Q A I T P R A B S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H
41 K E Q S I T P R A B S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 K E Q S I T P R A B S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 K E Q S I T P R A B S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H	41 K E Q S I T P R A B S Y I D I V Q D R M K Q R D K G S K L T G K P I N M Q E Q H
41 N Q Q T I T Q R A B S Y I D I V H N R M K R D I E S K R M T G K P I N M Q E Q H	41 N Q Q T I T Q R A B S Y I D I V H N R M K R D I E S K R M T G K P I N M Q E Q H	41 N Q Q T I T Q R A B S Y I D I V H N R M K R D I E S K R M T G K P I N M Q E Q H	41 N Q Q T I T Q R A B S Y I D I V H N R M K R D I E S K R M T G K P I N M Q E Q H
41 N Q Q T I T Q R A B S Y I D I V H N R M K R D I E S K R M T G K P I N M Q E Q H	41 N Q Q T I T Q R A B S Y I D I V H N R M K R D I E S K R M T G K P I N M Q E Q H	41 N Q Q T I T Q R A B S Y I D I V H N R M K R D I E S K R M T G K P I N M Q E Q H	41 N Q Q T I T Q R A B S Y I D I V H N R M K R D I E S K R M T G K P I N M Q E Q H
+-----+-----+-----+-----+			
41 S Q Q X I T P R A B S Y I D I V Q D R M K Q D I E S K L T G K P I N M Q E Q H	41 S Q Q X I T P R A B S Y I D I V Q D R M K Q D I E S K L T G K P I N M Q E Q H	41 S Q Q X I T P R A B S Y I D I V Q D R M K Q D I E S K L T G K P I N M Q E Q H	41 S Q Q X I T P R A B S Y I D I V Q D R M K Q D I E S K L T G K P I N M Q E Q H
+-----+-----+-----+-----+			
50	60	70	80
81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S
81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S
81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S
+-----+-----+-----+-----+			
81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S
+-----+-----+-----+-----+			
90	100	110	120
81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S
81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S
81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S	81 I D G W F L A R P W I F R D Q N N N H Q T N R F I S W P K D N I A S S K G Y N S
+-----+-----+-----+-----+			
121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y
121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y
121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y
+-----+-----+-----+-----+			
121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y
+-----+-----+-----+-----+			
130	140	150	160
121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y
121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y
121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y
+-----+-----+-----+-----+			
121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y	121 I A B Q M G L K I B A B N D M D V T N I D Y T S K T G D T I Y N G I S E L K N Y

(57) Abstract: The present invention relates to the isolation and characterization of nucleotide sequences encoding novel insecticidal proteins secreted into the extracellular space from *Bacillus thuringiensis* and related strains. The proteins are isolated from culture supernatants of *Bacillus thuringiensis* and related strains and display insecticidal activity against coleopteran insects including Colorado potato beetle (*Lymantria dispar*) and Southern Corn Rootworm (*Diabrotica undecimpunctata*). Insecticidal proteins encoded by nucleotide sequences that hybridize to the isolated and characterized nucleotide sequences are disclosed. Also disclosed are methods of making and using transgenic cells and plants comprising the novel nucleotide sequence of the invention.



European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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